Optimism and quality of life in patients with heart failure

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Chapter 4

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Abstract

Background: Health-related quality of life (HR-QoL) of patients with heart failure (HF) is low despite the aim of HF-treatment to improve HR-QoL. To date, most studies have focused on medical and physical factors in relation to HR-QoL, little data is available on the role of emotional factors like dispositional optimism. This study examines the prevalence of optimism and pessimism in HF-patients and investigates how optimism and pessimism are associated with different patient characteristics and HR-QoL.

Methods and results: Dispositional optimism was assessed in 86 HF-patients (mean age 70 ± 9 years, 28% female, mean left ventricular ejection fraction [LVEF] 33%) with the Revised Life Orientation Test (LOT-R). HR-QoL was assessed with the Minnesota Living with Heart Failure Questionnaire and the EuroQol. The (mean ± SD) total score on the LOT-R was 14.6±2.9 (theoretical range 0-24), the scores on the subscales optimism and pessimism were 8.1±1.9 and 5.5±2.5, respectively. Higher age was related to more optimism ($r=0.22$, $p<0.05$), and optimism was associated with higher generic HR-QoL ($B = 0.04$, $p<0.05$).

Conclusion: The association found between optimism and generic HR-QoL of HF patients can lead to promising strategies to improve HF patients' HR-QoL, particularly since the literature has indicated that optimism is a modifiable condition.

Introduction

Important objectives of HF treatment are symptom relief and improvement of health-related quality of life (HR-QoL).[1] Despite these objectives, HR-QoL of HF patients is seriously reduced compared with both a normative population[2] and patients suffering from other diseases.[3] Due to an increasing body of research on HR-QoL, more knowledge of how to improve HR-QoL is available. Previous research has focused mainly on medical and physical factors related to HR-QoL;[4-9] however, emotional factors[10] such as depressive symptoms are also highly prevalent in patients with HF [11,12] and are related to HR-QoL.[13] HF patients with a comorbid depressive disorder, for example, have a lower HR-QoL compared with HF patients without a comorbid depressive disorder. Interventions that aim to improve the depressive disorder are able to increase HR-QoL of these HF patients.[13] Psychosocial and existential concerns are important aspects of the lives of patients suffering from heart failure. [14] Personality factors, including dispositional optimism, can therefore affect how patients report on their health status [15] and their HR-QoL.[16] Dispositional optimism can be defined as the tendency to expect positive outcomes across a variety of life domains.[15] Common definitions indicate that pessimism is an antonym for optimism. Some investigators agree with this view, and tend to adopt optimism as a unidimension, classifying pessimism as the opposite end of optimism.[17] Within this context, the measure of optimism is constructed so that an optimistic outlook necessarily precludes a pessimistic outlook, and vica versa.[18] However, other researcher suggest that endorsing items that reflect an optimistic perspective is substantively different from disagreeing with items that reflect a pessimistic outlook.[19] If this is true, then optimism and pessimism would not represent opposite ends of a single continuum, but should be considered separate and, to some meaningful extent, independent constructs. Until today,

there is little consensus on the issue of pessimism being the opposite of optimism or being an independent construct.[18]

Optimism has been associated with favorable health outcomes and quality of life.[20] Pessimism on the other hand, has shown to be prospectively related to poor self-rated health and impaired psychological well-being.[21] In addition, a recent study showed that optimism is associated with a lower risk of developing heart failure.[22] However, the relation between optimism and pessimism and HR-QoL has not yet been examined in HF patients.

Although dispositional optimism is supposed to be a relatively stable construct, several studies have found that dispositional optimism is a modifiable condition.[18-20] Higher levels of dispositional optimism can be achieved by means of psychological interventions,[23-25] and such interventions may also improve HR-QoL of HF patients. In addition, there is a considerable amount of data on dispositional optimism in cancer patients showing that optimists have a better global HR-QoL than pessimists.[23,26-28] Several studies that examined how patients cope with a life threatening disease such as cancer found remarkable differences between individuals regarding health outcomes and HR-QoL, depending on their psychological adjustment to stress.[29,30] Older HF patients, for example, were found to be able to adapt their personal expectations to such an extent that they positively influenced their HR-QoL.[31]

In order to develop new interventions to improve HR-QoL of HF patients, it is important to examine the relationship between optimism and pessimism and HR-QoL of HF patients. Therefore, the present study aims to (1) describe the prevalence of optimism and pessimism in HF patients, (2) examine the association between clinical and demographic patient characteristics and optimism and pessimism, and (3) describe the relationship between optimism and pessimism and HR-QoL of HF patients.

Methods

Study population

A descriptive cross-sectional study was performed. In total, 159 outpatients who visited the HF clinic of the University Medical Center Groningen in the Netherlands between January 2012 and July 2012 were asked to participate in the study. Inclusion criteria were having a diagnosis of HF (independent of LVEF) New York Heart Association functional (NYHA) classification I-IV and being aged 50 or over. Patients with impaired cognition, inability to speak the Dutch language, or inability to understand informed consent as determined by the HF nurse were excluded from participation. Fifty-six patients declined to participate in the study. Of the enrolled patients, a further three patients were excluded from the analysis because they were not able to pass a test question necessary to complete a study assessment on patients' preferences which was also part of the data collection. [32] The study activities were combined with routine visits to the HF outpatient clinic, and the questionnaires were administrated by trained researchers who were not involved in the treatment of the included patients. The study was part of a larger study on HF patients' preferences.[32] The study conforms to the principles outlined in the Declaration of Helsinki. The Medical Ethics Committee approved the study protocol, and all enrolled patients provided their written informed consent.

Measurements

Dispositional optimism

Dispositional optimism was assessed with the Revised Life Orientation Test (LOT-R),[33] which is a widely used instrument in psychological research and which has good psychometric properties (e.g. Cronbach's alpha of .71 for the total score, and .64 and .77 for the optimism

and pessimism subscale scores).[15,33,34] The LOT-R consists of 10 items: three items are positively worded, three items are negatively worded, and four items are filler items. The respondents are asked to indicate their agreement on a 5-point Likert scale with response categories ranging from strongly agree to strongly disagree. Although originally composed as a unidimensional scale, some studies suggest a bidimensionality of two independent factors: optimism and pessimism.[21,34-36] Therefore, in this study, both the total score and the subscale scores on optimism and pessimism were used. The total score was calculated by summing the three positively worded items and the reverse-coded, negatively worded items. Scores on the LOT-R range from 0 to 24, with higher scores indicating more optimism. The optimism subscale score was calculated by summing the three positively worded items; the pessimism subscale score was calculated by summing the raw scores on the negatively worded items. Both subscales have a scoring range of 0 to 12, with higher scores indicating more optimism or more pessimism. Norm scores are not available for the LOT-R. The Cronbach's alpha in our study sample was .33 for the total score, .40 for the optimism subscale score and .60 for the pessimism subscale score.

Health-related quality of life

HR-QoL was assessed with a disease-specific (the Minnesota Living with Heart Failure Questionnaire [MLHFQ]) and a generic instrument (EuroQol [EQ-5D]). The MLHFQ is a widely used disease-specific questionnaire in HF research[37,38] with good psychometric properties.[37] The MLHFQ has a total score ranging from 0 to a maximum of 105 and consists of two domains: a physical component and an emotional component, with 40 and 25 as maximum possible scores, respectively. Lower scores on the MLFHQ reflect better HR-QoL.[39] Norm scores are not available for the MLHFQ.

The EQ-5D is designed for use across a wide range of health interventions[40] and is frequently used in cardiovascular trials.[41] The EQ-5D consists of 5 domains: mobility, self-care, usual activities, pain/ discomfort, and anxiety/ depression. Each domain has three levels: no problems, some problems, and severe problems. The scoring is based on the British tariff,[42] and values theoretically fall on the 0.0 (dead) to 1.0 (perfect health) value scale. Negative scores may occur, meaning that that particular health state is valued as worse than dead (from a societal perspective). Norm scores are available for the EQ-5D: male (70-74 years) +0.77, female +0.75.[43] Higher scores reflect better HR-QoL. In addition to the 5 domains, the EQ-5D contains an EQ visual analogue scale (EQ VAS), which records the respondent's self-rated health on a vertical scale from 0 to 100. Norm scores for the EQ VAS are 77.70 for males and 74.05 for females.[43]

Background characteristics

Demographic (age, gender, education) and clinical data (medical history, disease state) were collected from patient interviews and from patients' medical charts.

Statistical analyses

Descriptive analyses were used to characterize the patient sample. Data are presented as means ± standard deviations or frequencies (percentages). Bivariate analyses, Mann-Whitney U test, and Spearman's correlation coefficient, as appropriate, were performed to evaluate the relationship between background characteristics and the LOT-R (total and subscale) scores. Linear multiple regression analyses per subscale and total score were performed to determine whether the total score of the LOT-R, the optimism subscale and the pessimism subscale as independent variables were associated with quality of life as a dependent

variable. In the first block, only the LOT-R (total or subscale) score and HR-QoL scores were entered using the enter method. Based on univariate associations with $p < 0.10$ between the background characteristics and the LOT-R (total and subscale) scores, background characteristic variables were inserted in the final adjusted regression model in addition to the HR-QoL scores. This resulted in adding the variables 'living alone' and 'being religious' in the adjusted model for the LOT-R total score, the variables 'age' and 'having had a resuscitation in the past' in the adjusted model for the LOT-R optimism subscale score and the variables 'COPD' and 'hypertension' in the adjusted model for the LOT-R pessimism subscale score.

Analyses were performed using SPSS version 18.0.3 for Windows. Outcomes were considered statistically significant when $p < 0.05$.

Results

Patient characteristics

A total of 100 patients were included in this study. Fourteen patients were excluded from the analysis because they could not complete the questionnaire in time during the interview. The mean age of the patients was 70 ± 9 years, and 28% (n = 24) of the patients were female (*Table* 1). Patients had a mean LVEF of 33% ± 12%, and 35% (n = 30) of the patients were classified as NYHA functional class III-IV.

Dispositional optimism and health-related quality of life

The mean total score on the LOT-R was 14.6 ± 2.9. The mean scores on the LOT-R optimism subscale and pessimism subscale were 8.1 ± 1.9 and 5.5 ± 2.5, respectively (*Table* 2).

The mean total score on the MLHFQ was 30 ± 23. The mean scores on the physical and emotional components were 14 ± 12 and 6 ± 6, respectively. The mean score on the EQ-5D was 0.66 ± 0.28 and the EQ VAS 68 ± 46 (*Table* 2).

Relationship between dispositional optimism and pessimism and demographic and clinical variables

None of the independent variables were significantly related to the LOT-R total score ($p < 0.05$); however, there was a non-significant trend that not living alone and being religious were related to more dispositional optimism (patients who live alone [mean score 13.7] vs. patients who do not live alone [mean score 14.9] $U = 533$, $p<0.10$ and patients who are religious [mean score 15.2] vs. patients who are not religious [mean score 14.2] $U = 704$, $p<0.10$). Regarding the optimism subscale, having a higher age was related to more optimism ($r = 0.22$, $p<0.05$). Regarding the pessimism subscale, having COPD or hypertension as a comorbidity was associated with more pessimism (having COPD (mean score 6.6) vs. not having COPD (mean score 5.1) $U = 461$, $p<0.05$ and having hypertension (mean score 6.0) vs. not having hypertension (mean score 5.0) $U = 690$, $p<0.05$) (*Table* 3).

Relationship between dispositional optimism and pessimism and health-related quality of life

The optimism subscale of the LOT-R was significantly associated with HR-QoL when measured with the generic EQ-5D, but it was not significantly associated with HRQL when measured with the disease-specific MLHFQ. In the adjusted model (adjusted for variables associated with the LOT-R scores with a p-value < 0.10), the optimism subscale score remained significantly associated with the dimensions of the EQ-5D and the EQ-VAS score. The score on

the pessimism subscale and total score on the LOT-R were not associated with the EQ-5D or the MLHFQ (*Table* 4).

Discussion

This is the first study to examine the relationship between dispositional optimism and HR-QoL of outpatients with HF. We found that higher age was associated with more optimism and that having COPD or hypertension was associated with more pessimism, as measured with the subscales of the LOT-R. In addition, we found independent associations between optimism and generic HR-QoL and between optimism and EQ-VAS, indicating that being more optimistic is related to a better HR-QoL. Independent associations were only found between generic HR-QoL and optimism, not between disease-specific HR-QoL and optimism. It could be that the MLFHQ was not sensitive enough in this population because of the small sample size of the study population.[44]

The scores on the LOT-R of our study population are difficult to compare with the scores reported in other studies because only one study has used the LOT-R in HF patients before.[45] The levels of optimism in our study population were lower than those found in the study of Giardini, [45] which might be explained by the higher age of the patients in our study. The HF patients in our study were slightly less optimistic compared with coronary bypass surgery[33] patients and urogenital cancer patients.[35] However, they were less pessimistic compared with patients with urogenital cancer.

Optimism is related to quality of life and this may be useful for future interventions. Because HF has a poor prognosis and causes severe symptoms, alternative ways to improve the HR-QoL of HF patients need to be further explored. Several studies in cancer patients

found that optimists had a better global HR-QoL than pessimists.[23,26-28] A systematic review on psychosocial interventions for cancer patients[46] found two intervention studies with a moderating effect on dispositional optimism. After a cognitive-behavioral stress management intervention, women who showed lower levels of optimism prior to the intervention reported enhanced optimism relative to those who had higher levels of optimism prior to the intervention.[47] Another study[48] found the moderating effect of psychosocial factors, including dispositional optimism, after a nutrition-focused psychoeducation program.

Healthcare providers may wish to identify those patients who are at risk of being pessimistic since this may affect their HR-QoL. We found that the comorbidities COPD or hypertension were associated with more pessimism. The literature suggests that comorbidities also affect HR-QoL of patients with HF.[2] The comorbidities COPD and hypertension are frequently found in HF patients, and treatments are needed that target both these comorbidities and HF.[49] Furthermore, more research is necessary to explore the association between hypertension and pessimism in depth, as hypertension is usually a diagnosis with relatively low complaints compared to the diagnosis COPD.

However, at the same time we realize that interventions aimed directly at improving optimism are scarce, which makes it difficult to indicate what psychological care for patients with lower levels of optimism should look like. Applebaum[50] speculates that the incorporation of screening for optimism – among other variables – into routine clinical care will allow for the prompt identification and referral of patients with low levels of optimism and social support to psychosocial programs that either directly provide (e.g., through group psychotherapy) or facilitate social support and promote the recognition of the possibility of the benefit and growth despite suffering. This may serve as a protective factor against

psychopathology. A recent systematic review of the influence of psychological factors on HR-QoL after a stroke also confirms the need for more research on optimism.[51]

Since our study is one of the first to address dispositional optimism and HR-QoL more research is needed to be able to develop promising psychological interventions and to identify those patients who will benefit from these interventions.

Limitations of this study are its cross-sectional nature and the small sample size. More non-interventional research on a larger population of patients in routine care is indicated and would strengthen the results of future studies. Furthermore, the independent association between optimism and general HR-QoL could be refined further in a larger study population when the patients are assigned to different groups depending on for example there LVEF and/ or severity of HF symptoms (NYHA-classification). We could not compare the clinical characteristics of the patients who participated with those who refused to participate because we did not have the latter group's signed informed consent. Nevertheless, the demographic and clinical parameters of our study population are comparable with those of the population in our HF patient clinic and other main studies.[52,53] In our study we did not collect information whether the patients underwent previous CABG treatment or whether they suffered from dyslipidemia, these factors might also have an impact on the scores of the used instruments and would be a suggestion for further studies on optimism in patients with HF.

Conclusion

This study provides new insights into dispositional optimism in patients with HF and is, to our knowledge, the first study to explore the relationship between dispositional optimism and HR-QoL of patients with HF. This study found a relationship between optimism and HR-QoL

of patients with HF. Given that the literature has suggested that optimism is a modifiable condition, improving optimism may be a promising way to improve HR-QoL of HF patients. However, more research is needed to assess which patients will benefit from psychological care and which specific psychological interventions are needed to improve their HR-QoL.

Tables

Table 1. Demographic and clinical characteristics of the study population (n = 86).

	Study population (n = 86)
Patient characteristics	
Age (years)	70 (±9)
Gender (female)	28% (24)
Living alone	26% (22)
Being Religious	42% (36)
Clinical characteristics	
LVEF %	33 (±12)
NYHA III-IV	35% (30)
Laboratory :	
Hemoglobin (mmol/l)	8.6 (±1.1)
eGFR (ml/min*1.73m2)	53.6 (±20.0)
NT-pro-BNP (ug/l) (IQR)	1055 (421-3082)
Ischemic heart failure	58%(50)
ICD implantation	41% (35)
Resuscitation in the past	11% (9)
Myocardial infarction	51% (44)
Duration of heart failure (years)	2.6 (±3.4)
HF readmission in last 6 months	31% (27)
Co-morbidities:	
COPD	26% (22)
Diabetes Mellitus	28% (24)
Stroke	12% (10)
Hypertension	55% (47)
Cancer	6% (5)

Note:

Mean (±SD), percentage (number) or median (minimum-maximum)

HF = heart failure; LVEF = left ventricular ejection fraction; NYHA = New York Heart Association; eGFR = estimated globular filtration rate; NT-pro-BNP = N-terminal prohormone of brain natriuretic peptide; IQR = Inter Quartile Range; ICD = internal cardiac defibrillator; COPD = Chronic obstructive pulmonary disease.

Table 2. Optimism- and health-related quality of life scores of the study population (N = 86)

	Study population (n = 86)
Optimism	
LOT-R	
Total score	14.6 ± 2.9
Optimism subscale score	8.1 ± 1.9
Pessimism subscale scores	5.5 ± 2.5
Health-related quality of life	
MLHFQ	
Total score	30 (±23)
Physical component	14 (±12)
Emotional component	6 (±6)
EQ-5D	0.66 (±0.28)
EQ VAS	68 (±46)

Note:

Mean (±SD); LOT-R = Life Orientation Test-Revised; MLHFQ = Minnesota Living with Heart Failure Questionnaire; EQ-5D = EuroQol-5 Dimensions; EQ VAS = EuroQoL visual analogue scale.
Optimism total score/ optimism subscale/pessimism subscale: higher scores reflecting more dispositional optimism/ optimism/pessimism.
MLHFQ total score and subscales: lower scores reflecting better HR-QoL
EQ-5D and EQ VAS: higher score reflecting better HR-QoL

Table 3. Univariate associations between optimism and pessimism and demographic and clinical characteristics (N = 86)

		LOT-R	
	Total	Optimism	Pessimism
Patient characteristics			
Age (years)	0.02	**0.22	0.13
Gender	659	714	675
Living alone	*533	611	579
Being religious	*704	812	751
Clinical characteristics			
LVEF %	-0.01	-0.08	-0.10
NYHAIII-IV	783	839	804
Ischemic heart failure	839	793	862
Myocardial infarction	882	862	900
ICD implantation	769	815	767
Resuscitation in the past	267	*232	346
Duration of heart failure (years)	-0.01	0.04	0.04
HF readmission in last 6 months	752	710	767
Laboratory:			
eGFR (ml/min*1.73m2)	-0.02	0.02	0.05
NT-pro-BNP (ug/l)	-0.02	0.02	0.06
Comorbidities:			
COPD	553	668	**461
Diabetes Mellitus	692	675	631
Stroke	379	352	361
Hypertension	730	885	**690
Cancer	145	141	117

Note:

Data are presented as U for categorical independent variables and r for continues independent variables

* p<0.10, ** p<0.05

HF = heart failure; LVEF = left ventricular ejection fraction; NYHA = New York Heart Association; ICD = internal cardiac defibrillator; eGFR = estimated globular filtration rate; NT-pro-BNP = N-terminal prohormone of brain natriuretic peptide; COPD = Chronic obstructive pulmonary disease; LOT-R = Life Orientation Test-Revised.

Table 4. Multivariate associations between optimism, pessimism, and health related quality of life (HR-QoL) (N=86).

	LOT-R								
	Total			Optimism			Pessimism		
	B	SE	p-value	B	SE	p-value	B	SE	p-value
MLHFQ									
Total score	-0.05	0.90	0.95	-1.81	1.40	0.20	-0.94	1.05	0.38
Total score adjusted model*	0.62	0.86	0.48	-0.79	1.28	0.54	-1.15	0.98	0.24
Physical component	-0.16	0.44	0.71	-0.78	0.70	0.27	-0.20	0.52	0.71
Physical component adjusted model*	0.01	0.42	0.99	-0.51	0.63	0.43	-0.31	0.50	0.54
Emotional component	-0.04	0.21	0.85	-0.62	0.32	0.06	-0.30	0.24	0.23
Emotional component adjusted model*	-0.05	0.19	0.81	-0.45	0.29	0.13	-0.08	0.23	0.73
EQ-5D									
Dimensions	0.01	0.01	0.22	0.04	0.02	0.03	0.00	0.01	0.82
Dimensions adjusted model*	0.02	0.01	0.09	0.04	0.02	0.02	0.00	0.01	0.86
EQ VAS	0.55	0.61	0.37	2.92	0.90	< 0.01	0.90	0.71	0.21
EQ VAS adjusted model*	0.33	0.61	0.59	2.50	0.92	< 0.01	0.85	0.77	0.27

Note:

LOT-R = Life Orientation Test-Revised; MLHFQ = Minnesota Living with Heart Failure Questionnaire; EQ-5D = EuroQol-5 Dimensions; EQ VAS = EuroQoL Visual Analogue Scale.

* Adjusted for demographical and clinical characteristics significantly (p<.010) associated with the specific HR-QOL score or LOT-R score

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